SECTION 02554

STEAM AND CONDENSATE DISTRIBUTION

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LANL MASTER CONSTRUCTION SPECIFICATION

When editing to suit project, author shall add job-specific requirements and delete only those portions that in no way apply to the activity (e.g., a component that does not apply). To seek a variance from applicable requirements, contact the Engineering Standards Manual (ESM) Civil POC.

When assembling a specification package, include applicable specifications from all Divisions, especially Division General Requirements.

Delete information within "stars" during editing.

Coordinate with Civil Standard Drawings ST-G3040-1, Steam/Condensate Tie-in Detail.

Specification developed for ML-3/ML-4 projects. For ML-1 / ML-2, additional requirements and QA reviews are required

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PART 1 GENERAL

1.1 SECTION INCLUDES

A. Site steam and condensate distribution piping, fittings, valves, steam trap, etc. See definitions below.

1.2 LANL PERFORMED WORK

A. LANLs Support Services Subcontractor will tie into existing site steam or condensate piping system.

1.3 DEFINITIONS

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Design all piping upstream of the building steam PRV for 150 psig and 500 degrees F. Design condensate piping for 250 degrees F.

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A. Site Steam Distribution Piping: Steam piping upstream of first steam shutoff valve (including valve) inside building.

B. Site Condensate Distribution Piping: Condensate piping upstream of first steam shutoff valve inside building, including steam trap piping upstream of first steam shutoff valve.

1.4 SUBMITTALS

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Submittals shall be approved by the LANL Utilities Group steam system representative.

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A. Submit the following in accordance with Section 01330, Submittal Procedures:

1. Catalog data on pipe and pipe fittings, valves, steam trap, welding rod, cathodic protection systems, and condensate pipe coating.

2. Certified material test report for the pipe.

3. Certification of welders and qualified welding procedures.

4. Welding Process Visual Examination Report.

5. Installation instructions for pre-insulated steam/condensate piping.

6. Plan and profile for steam/condensate piping system.

7. Expansion calculation for steam/condensate piping system.

1.5 QUALITY ASSURANCE

A. Welding

1. Welders: Certified in accordance with Section IX of ASME Boiler and Pressure Vessel Code.

2. Welding Materials and Procedures: Comply with Section IX of ASME Boiler and Pressure Vessel Code.

3. Visual Examination: Comply with ASME B31.1, Power Piping.

B. Dimensions

1. Dimensions (valves, fittings and flanges): Comply with ASME B16 series standards.

C. Installation

1. Distribution Piping: Comply with ASME B31.1, Power Piping.

PART 2 PRODUCTS

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Distribution piping, fittings, and materials described herein are generally restricted to a maximum 150 psig working steam pressure (WSP) with 500 degrees F temperature. For other pressure and temperature ratings, additional specification and restrictions may be required. Different products or materials are listed for each application. Select one or any combination for the application. Refer to Part 3 for valves and strainers installation instruction.
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2.1 PRODUCT OPTIONS AND SUBSTITUTIONS

A. Alternate products may be accepted; follow Section 01630, Product Options and Substitutions.

2.2 STEAM PIPING, BELOW GRADE (150 PSIG MAXIMUM)

A. Pipe: Black steel, A106, Grade B, Schedule 40.

B. Fittings (socket weld): Forged steel, ASTM A105, Class 3000.

C. Fittings (butt weld): Wrought carbon steel, ASTM A234, Grade WPB, Schedule 40.

D. Joints: Welded.

2.3 CONDENSATE PIPING, BELOW GRADE (150 PSIG MAXIMUM)

A. Pipe: Black steel, Schedule 80, ASTM A53, Type E, Grade B or A106, Grade B.

B. Fittings (socket weld): Forged steel, ASTM A105, Class 3000.

C. Fittings (butt weld): Wrought carbon steel, ASTM A234, Grade WPB, Schedule 80.

D. Joints: Welded.

E. Coating: See Part 3, Corrosion Control.

2.4 PRE-INSULATED STEAM PIPING, BELOW GRADE (150 PSIG MAXIMUM)

A. Manufacturer: Perma-Pipe, Multi-Therm 500, or Thermacor, Duo-Therm 505, factory prefabricated, preinsulated piping system, suitable for 500 degrees F.

B. Distribution Pipe: Black steel, A106, Grade B, Schedule 40.

C. Outer Conduit: Black steel, minimum 10 gage thickness.

D. Distribution Pipe Insulation: Mineral wool contained within a drainable, dryable, pressure tested steel conduit.

E. Outer Conduit Insulation: One-inch minimum polyurethane foam, ASTM C591, encased in fiberglass (FRP) jacket or high-density polyethylene (HDPE) jacket.

F. Pipe Fittings (socket weld): Forged steel, ASTM A105, Class 3000.

G. Pipe Fittings (butt weld): Wrought carbon steel, ASTM A234, Grade WPB, Schedule 40.

H. Joints: Butt welded for pipe size 2 1/2 inches and larger, and socket welded for 2 inches and below.

2.5 PRE-INSULATED CONDENSATE PIPING, BELOW GRADE (150 PSIG MAXIMUM)

A. Manufacturer: Perma-Pipe, Poly Therm, or Thermacor, HT 366, factory prefabricated, preinsulated piping system.

B. Distribution Pipe: Black steel, Schedule 80, ASTM A53, Type E, Grade B or A106, Grade B.

C. Conduit Insulation: One-inch minimum Polyurethane foam, ASTM C591, encased in fiberglass (FRP) jacket or high-density polyethylene (HDPE) jacket.

D. Pipe Fittings (socket weld): Forged steel, ASTM A105, Class 3000.

E. Pipe Fittings (butt weld): Wrought carbon steel, ASTM A234, Grade WPB, Schedule 80.

F. Joints: Butt welded for pipe size 2 1/2 inches and larger, and socket welded for 2 inches and below.

2.6 STEAM PIPING, ABOVE GRADE AND IN STEAM PITS (150 PSIG MAXIMUM)

A. Pipe: Black steel, A106, Grade B, Schedule 40 (welded pipe).

B. Pipe: Black steel, A106, Grade B, Schedule 80 (threaded pipe).

C. Fittings (threaded): Forged steel, ASTM A105, Class 2000.

D. Fittings (socket weld): Forged steel, ASTM A105, Class 3000.

E. Fittings (butt weld): Steel, ASTM A234, Grade WPB, Schedule 40.

F. Joints: Threaded for pipe sizes up to 3/4 inch, welded or flanged for pipe sizes above 3/4 inch.

2.7 CONDENSATE PIPING, ABOVE GRADE AND IN STEAM PITS (150 PSIG MAXIMUM)

A. Pipe: Black steel, Schedule 80, ASTM A53, Type E, Grade B or A106, Grade B.

B. Fittings (threaded): Forged steel, ASTM A105, Class 2000.

C. Fittings (socket weld): Forged steel, ASTM A105, Class 3000.

D. Fittings (butt weld): Steel, ASTM A234, Grade WPB, and Schedule 80.

E. Joints: Threaded for pipe sizes up to 3/4 inch, welded or flanged for pipe sizes above 3/4 inch.

2.8 FLANGES, FOR PIPE SIZES OVER 2 INCHES

A. Forged steel, ASTM A105, Grade 1, ANSI Class 150, weld neck, raised face, dimensions per ANSI B16.5

2.9 GASKET MATERIAL

A. Steam Piping: Flexitallic, non-asbestos, CG style

B. Condensate Piping: Sheet gasket, branded material, 1/16 inch thick, non-asbestos, suitable for steam service up to 500 degrees F. Klinger, No. C4401.

2.10 BOLTS, STUDS AND NUTS

A. Bolts/Studs: Alloy steel, ASTM A193, Grade B7.

B. Nuts: Alloy steel, ASTM A194, Grade 2H.

2.11 STEEL GATE VALVES (THREADED ENDS)

A. Manufacturer: Vogt, Series 12111.

B. Forged steel, ASTM A105, Grade 2, Class 800, steam service, 500 degrees F at 1595 psig, rising stem, threaded ends, hard faced seat and disc.

2.12 STEEL GATE VALVES (FLANGED OR WELDED ENDS)

A. Manufacturer: Powell, Figure 1503N.

B. Cast carbon steel, ASTM A216, Grade WCB, Class 150, steam service, 500 degrees F at 170 psig, rising stem, flanged or welded ends to suit piping, hard-faced seat and disc.

2.13 STEEL GLOBE VALVES (THREADED ENDS)

A. Manufacturer: Vogt, Series 12141.

B. Forged steel, ASTM A105, Grade 2, Class 800, steam service, 500 degrees F at 1595 psig, rising stem, threaded ends, hard-faced seat and disc.

2.14 STEEL GLOBE VALVES (FLANGED OR WELDED ENDS)

A. Manufacturer: Powell, Figure 1531.

B. Cast carbon steel, ASTM A216, Grade WCB, Class 150, steam service, 500 degrees F at 170 psig, rising stem, flanged or welded ends to suit piping, hard-faced seat and disc.

2.15 STEEL CHECK VALVES (THREADED ENDS)

A. Manufacturer: Vogt, No. S701.

B. Forged steel, ASTM A105, Class 800 steam service, 500 degrees F at 1595 psig, horizontal swing check, hard faced seat.

2.16 STRAINERS

A. “Y” Type rated for 250 psig steam, 20 mesh stainless steel screens, steel body, ASTM A216 with blowoff gate valve and plug.

2.17 THERMOSTATIC TRAP

A. Manufacturer: Yarway, 761-5 Bellows type

B. Trap: Carbon steel body, stainless steel trim, integral strainer, maximum operating pressure 300 psig at 750 degrees F. Size, 3/4 inch.

2.18 EXPANSION JOINTS

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Contact LANL Utilities Group gas system representative for review and approval for use of appropriate expansion joint in piping system. Consult with manufacturer for sizing information and part number.
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A. Manufacturer: Senior Flexonics, Pathway Division, Part No. [Series HCF].

B. Metal expansion joint, 150 psig single controlled flexing bellows with ANSI flanged ends, covers, and tie rods. Stainless steel bellows maximum pressure and temperature 300 psi / 800 degree F.

PART 3 EXECUTION

3.1 PREPARATION

A. Ream pipe and tube ends. Remove burrs.

B. Remove scale and dirt on inside and outside of piping before assembly.

C. Keep open ends of pipe free from scale and dirt. Whenever work is suspended during construction, or at the end of each workday, protect open ends with temporary plugs or caps.

3.2 BURIED PIPING

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Tracer wire and test stations are required when specifying cast iron, ductile iron, and non-metallic piping. Comply with Civil Standard Drawing ST-G30GEN-3 for tracer wire/test station details and Civil Standard Drawing ST-G30GEN-4 for trenching detail.

Refer to the LANL Engineering Standards Manual, Civil Chapter, Section G30, for required utility line clearances.
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A. Refer to Drawings and Section 02310, Grading, Excavating, and Trenching, for earth cover, bedding, tracer wire, wire continuity test, warning tape, documenting new or exposed existing utility location, etc., requirements.

3.3 INSTALLATION

A. Install in accordance with manufacturers' instructions.

B. Route piping in orderly manner and maintain gradient.

C. Provide sleeve and packing gland or compressible modular seal between sleeve and pipes penetrating exterior walls or manholes below grade to provide a waterproof installation.

D. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.

E. Provide clearance for installation of insulation and access to valves and fittings.

F. Slope steam and condensate piping 1 inch in 40 feet (0.25 percent) in direction of flow.

G. Install valves with stems upright or horizontal, not inverted.

H. Use steel valves and strainers in piping above grade and in steam pits, threaded ends for piping up to 3/4 inch, welded or flanged ends for piping above 3/4 inch

I. Provide eccentric reducers, flat on bottom, in horizontal runs of steam and condensate piping.

J. Provide globe valves for throttling, bypass, or manual flow control services.

K. Provide gate valves for first steam valve inside building.

L. Connect steam and condensate branch lines into top of main or at a 45-degree angle from top of main.

M. Pressure test piping in accordance with Section 15992.

N. Support piping in accordance with section 15060.

O. Insulate piping in accordance with Section 15080.

P. Install factory prefabricated, preinsulated underground distribution piping in accordance with manufacturer's instructions. Piping manufacturer shall provide factory trained field technical assistance for critical periods installation, e.g., field joint instructions, pressure testing.

Q. Locate first steam shutoff valve inside building within 5 feet of building wall penetration.

3.4 PIPING TIE-IN

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Contact LANL Utilities Group steam system representative for point of tie-in and required details. Designer shall submit required details for specific installation to LANL Utilities Group for final approval. Refer to the ESM Civil Standard Drawings ST-G3040-1 for tie-in detail.

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A. Tie-in to existing steam and condensate piping systems will be performed by LANLs Support Services Subcontractor (SSS). Excavation, backfill and materials required for tie-in shall be provided by Contractor. The tie-in will be inspected by the LANL Construction Inspector and the LANL Utilities Group steam system representative.

B. Notify LANL Construction Inspector at least 10 working days in advance to schedule tie-in. The LANL Construction Inspector will notify LANL's SSS.

C. Prior to notifying SSS, the LANL Construction Inspector will ensure materials required for tie-in are on site, service lines have been tested, and material submittals and all test reports have been approved by LANL Utilities Group.

3.5 CORROSION CONTROL

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Contact SSS Utilities Corrosion Specialist (665-5270), or the LANL Utilities Group gas system representative for cathodic protection requirements. Also refer to the ESM Electrical Chapter, Section G4040 (future). NOTE: Factory pre-insulated piping systems (e.g., Perma-Pipe, Poly Therm) may be used as a replacement for corrosion control and field insulation. NOTE: Pipe coating is not required for steam piping. The following is an example of a condensate piping coating specification. Verify part numbers with manufacturer.
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A. Buried Condensate Pipe and Joint Coating: Field coating shall be a minimum of 30 mils thick and suitable for a continuous operating temperature of 250 degrees F.

1. Joints and Fittings: Apply a hand brush application of primer, Polyken 1627 and a double layer of half-lapped tape, Polyken 1636.

2. Apply field coatings in accordance with the manufacturer's instructions.

END OF SECTION

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Do not delete the following reference information:
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FOR LANL USE ONLY

This project specification is based on LANL Master Construction Specification Rev. 3, dated November 26, 2003.